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appeared, but No. 13 is the one to which especial attention is asked. Did our space allow we should publish it in full, but enough is furnished to show the grand scheme which Professor Goode has in mind.

OUTLINE OF A SCHEME OF MUSEUM CLASSIFICATION.

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Since Professor Goode invites criticism, the NATURALIST desires to further his wishes by urging upon anthropologists to procure circular 13 and to give him the benefit of their experience.

GEOLOGY AND PALÆONTOLOGY.

MAMMALIA IN THE LARAMIE FORMATION.—Mammalia, which have been so long looked for in vain in the Laramie beds, have at length been found. Mr. J. L. Wortman, who was sent to explore this formation the past season, was instructed to look especially for Mammalian remains. He now announces that he has found them in place and mingled with Dinosaurian remains in such a manner as to admit of no doubt of their contemporaneity. Two species have come to hand, of which the following only is determinable.

Meniscoëssus conquistus, gen. et sp. nov.—But one specimen of this animal was found, and that is represented by two molar teeth and a distal extremity of a humerus. Were it not for the associated molar tooth, I should think that the second tooth might be that of a herbivorous reptile. It is probably a fourth premolar of the general type of that of the *Plagiaulacidae*.

Char. gen.—Fourth premolar with a compressed anteroposterior edge, which is studded with denticles; sides without ridges. Posterior molar rather small; crown with three longitudinal series of tubercles, of which many have crescentic sections.

This form is plainly not a distant relative of the *Plagiaulacidae*, recently described in the NATURALIST, from the Puerco Eocene of New Mexico, and it may enter that family. Its molar has the same number of rows of cusps as in *Polymastodon* Cope. The tooth is, however, of especial interest from its resemblance to the molar of the genus *Stereognathus* Owen, from the Oölite of England, showing clearly that that genus, whose affinities have been hitherto unknown, must be referred to the neighborhood of the *Plagiaulax* of the same great Jurassic period. The humeral condyles have the remarkable characters of those of *Catopsalis*.

Char. specif.—The premolar is large as compared with the molar, but the disproportion is not so great as in *Ptilodus mudicivus*. It has one side convex and the other plane, and each is bounded by a cingulum at the base. The sections of the denticles are ovals, transverse to the edge of the crown. The grooves which separate them are continued downward on the convex face, but not on the plane face. The enamel is minutely wrinkled. One end of the crown is lost, as it is also in the true molar. The latter has the crown expanded laterally, so that the longitudinal grooves are wide open, and not closed as in *Catopsalis*. The median ones are transverse crescents in section; those of one edge are half crescents, and those of the opposite edge are the least, and are transversely oval in section. In the fragment the number of lobes is 4-3-4; the last row of small cusps being complete, and turning into the median at both extremities. No cingula. Elevation of crown of P-m. iv, .007; width of do. at base, .006; width of molar, .006.

This species was about the size of the Australian bandicoot, and was probably a true marsupial.—*E. D. Cope*.

A NEW FORM OF TÆNIODONTA.—The Puerco beds of New Mexico continue to produce new types of Mammalia. The genus now to be described is probably a Tæniodont, and allied to *Calamodon*, but the absence of the canine teeth renders the determination incomplete. The incisors, while of the form of those of *Calamodon*, had a limited period of growth, and the root displays a contracted base. The enamel also extends but a short distance on the anterior face of the tooth. The probable first inferior incisors are quite small, but are generally like the second or large ones. The superior molars have but a single conic root, but in some of them a fissure of the external side marks the usual place of division. The crowns are narrow and transverse to the axis of the jaw. I call this genus *Hemiganus*, and the species *H. vultuosus*.

Char. specif.—Large incisors strongly curved, robust, wearing with a strong posterior shoulder. Shaft with the dentine finely and sharply ridged. Inferior apex compressed; front regularly rounded. Enamel? ridged or smooth. Superior molar with narrowed transverse crowns, and roots covered with a thin layer of cementum. There are one, perhaps two external cusps, but the crowns are all much worn. One crown, perhaps inferior, is sub-round with a notch, as in *Calamodon* sp. Enamel short, with equal base, smooth. Length of first incisor, .026; diameter of crown, anteroposterior, .008; transverse, .014. Length of second incisor, .094; diameters of crown, anteroposterior, .029; transverse, .019. Length superior molar, .0225; diameters crown, anteroposterior, .010; transverse, .017. Diameter inferior molar (second specimen), anteroposterior, .011; transverse, .011. Dis-

covered by D. Baldwin in New Mexico. The species is a little larger than the *Psittacotherium multifragum*.—E. D. Cope.

THE PERIPTYCHIDÆ.—The structure of *Periptychus* has remained uncertain so far as regards the limbs and feet. As these parts have much significance, I point out some of their characters as seen in specimens recently received from the Puerco beds.

The brain is, as in *Phenacodus*, very small, with the olfactory lobes widely separated from the small hemispheres. The humerus has an epitrochlear foramen. The astragalus has no trochlear groove, and the neck is short. The head is convex, and presents a lateral face for contact with the side of the cuboid. Five digits on the posterior foot. The lateral ungues are rather narrow hoofs. Cervical vertebræ very short.

The absence of trochlea of the astragalus is a point of resemblance to *Meniscotherium*, and separates *Periptychus*¹ from the *Phenacodontidæ* as a family type, which I call the *Periptychidæ*. With it must no doubt be associated *Anisonchus* Cope, *Haploconus*, and the following new genus.

Hemithlæus kowalevskianus, gen. et sp. nov. *Char. gen.*—Dentition of the type of *Anisonchus*, but there is but one internal tubercle of the superior true molars, which is the apex of the V, the posterior cusp being absent, no intermediate tubercles. Last and penultimate premolars with internal cusp. Last inferior true molar with heel.

Char. specif.—The internal lobes of both third and fourth premolars are conic. The true molars are distinguished from the species of *Anisonchus* and *Haploconus* in that the posterior cingulum does not develop an internal cusp. Instead of this, the apex of the median V forms the internal angle of the crown, and an anterior and a posterior cingula of equal size rise to meet it. The inferior molars have anterior and posterior median cusps, and the internal anterior cusp is not compressed. Length of P-m. iv with true molars, .0185; diameters P-m. iv, anteroposterior, .005; transverse, .007; do. of M. ii, anteroposterior, .0046; transverse, .007. The last true molar is smaller than the first or second. Two individuals from the Lowest Puerco. Larger than *A. sectorius*. Dedicated to the distinguished palæontologist, Dr. W. Kowalevsky, at present traveling in this country.

In the August number of the NATURALIST it was shown that there are species of *Haploconus* with the interior lobe of the fourth premolar conical. I now find a species of *Anisonchus* which presents the same peculiarity. I describe it as follows:

Anisonchus coniferus, sp. nov.—Three individuals of larger size than the *H. kowalevskianus*. This species differs materially from the last in the larger development of the cingular internal cusp of the superior true molars, so that the transverse diameter of the latter

¹ *Catathlæus* was established on the permanent dentition of *Periptychus*.

exceeds that of any of the species of this group. The apex of the median V is not very prominent. Third superior premolar with a rudiment of the anterior and posterior basal lobes; internal lobe not large, conic. Fourth not wider than first true molar, which equals the second and exceeds the third in size. An external cingulum on the true molars, none on the premolars. Probable inferior true molars with anterior and posterior median cusplets. Length of base of four last molars, .020; width of base of P-m. III, .006; length of do., .005, do. of P-m. IV, .008; length of do., .007. Diameters of M. II, anteroposterior, .005; transverse, .0095. From the Lowest Puerco. D. Baldwin.—*E. D. Cope*.

SOME NEW FORMS FROM THE PUERCO EOCENE.—*Miocænus protogonioides*, sp. nov. The largest species of the genus, represented by the superior true molars. It is an exaggerated form of the *M. subtrigonus*. The internal angle of the V, as well as the intermediate tubercles at the ends of its limbs, are distinct. Cingula extending entirely round the crown, the posterior with a small tubercle on the M. II as in *A. subtrigonus*; none on M. III, which is .75 the area of the M. II. Diameters M. II, anteroposterior, .008; transverse, .010. Diameters M. III, anteroposterior, .007, transverse, .009. From the Lowest Puerco of New Mexico, D. Baldwin.

Miocænus opisthacus, sp. nov.—The species of this genus brought thus far from the Puerco formation have no internal cusp, but a ridge on the internal side of the heel of the inferior true molar teeth. The *M. brachystomus* of the Wasatch has such a cusp. The present species from the Puerco also possesses this cusp. It differs from the *M. brachystomus* in its much larger size and more robust premolars. The latter are, however, less robust than in *M. turgidus* and have an oval anteroposterior section. The fourth has a small heel, but no anterior basal lobe. The true molars are of subequal size and not smaller than the premolars. No anterior inner nor posterior median cusps. Length of last four molars, .025; do. of P-m. IV, .006; of last true molar, .0065. Depth of ramus at M. II, .0116. Three individuals.

Miocænus baldwini, sp. nov.—The description of the last species applies to this one in many respects, including the posterior inner lobe of the inferior true molars, but the size is less, and the last inferior molar is materially smaller. There is also a well defined anterior internal cusp on the second true molar. The ramus becomes quite slender anteriorly. Length of last six molars, .035; do. of last four, .022; do. of P-m. IV, .0057; do. of M. I, .0053; do. of M. III, .0055. Dedicated to D. Baldwin, the discoverer of the Puerco fauna.

Protogonia plicifera, sp. nov.—This, the second species of the genus, differs from its congener, *P. subquadrata*, in that the inter-

nal cusp of the fourth superior premolar is connected with the anterior and posterior cingula by strong ridges, becoming thus the apex of a V. In the *P. subquadrata* it is a simple cone. Antero-external basal lobe distinct, intermediate lobe obsolete. The true molars are like those of the *P. subquadrata*, but all the molars are of smaller size. Length of P-m. iv, plus M. ii and M. iii, .0215; diameters P-m. iv; anteroposterior, .006; transverse, .007; do. of M. ii, .0095 and .008. D. Baldwin.

Dissacus carnifex, sp. nov.—This creodont differs from its only congener in its greater size, and in the presence of an anterior basal lobe on the third inferior premolar. This is wanting in *D. navajovius*. As compared with the latter the six inferior molars are as long as its seven, and the mandibular ramus is much deeper. Like it the P-m. iv and the true molars have an anterior basal tubercle: and the last two true molars have an internal supplementary cusp. After the *Sarcothraustes antiquus*, the largest flesh-eater of the Puerco. Length of last six molars, .075; of true molars, .038; of P-m. iv, .0125; of M. ii, .0135; of M. iii, .0130. Depth of ramus at M. ii, .029. Upper Puerco, D. Baldwin.—*E. D. Cope*.

GEOLOGICAL NEWS.—The July number of the *American Journal of Science* contains a succinct account of the phenomena of metalliferous vein formation now in progress at Sulphur Bank, near Clear lake, Cal., including a description of the geology of the vicinity, by Professor Joseph Le Conte. To the same magazine Rev. A. A. Young contributes observations on the crystallized sands of the Potsdam sandstone of Wisconsin; and G. K. Gilbert writes upon the origin of jointed structure, combating the theory of Professor John Le Conte, who in the March number of the same magazine explains the jointed structure of the Quaternary clays of the Great Salt Lake desert by referring it to the same category with shrinkage cracks observed in recent Californian alluvial deposits. Shrinkage cracks form four to seven sided irregular masses, the included angles varying greatly, whereas the joints of indurated rocks are characterized by parallelism, and the lines of two systems of joints cross each other, which is not the case in shrinkage cracks. Mr. Gilbert then takes up the theory which classes joints with slaty cleavage, and attributes them to lateral compression. As it appears improbable that a broad sheet of fresh-water sediments, so fresh that the shore-trace of the formative lake has scarcely been impaired by the weather, should have been laterally compressed in two directions nearly at right angles to each other so as to form the two systems of joints which exist in it, and as, moreover, only a single system of joints exists in the Triassic and Jurassic sandstones of the Colorado plateaus, Mr. Gilbert dismisses this theory also as untenable, and regards the question as still an open one.—The

Report upon the Geology and Mining Industry of Leadville, Col., by S. F. Emmons, contains thorough details of the Palæozoic and eruptive Mesozoic rocks of the district, and of the ores, which principally occur underneath a porphyry sheet and chiefly in cavities penetrating the "Blue" limestone, the lowest member of the carboniferous.

MINERALOGY.¹

CHROME TOURMALINE.—Cossa and Arzruni describe in the *Zeitschrift für Krystallographie* a new variety of tourmaline, in which chromic oxide replaces a portion of the alumina. The tourmaline, of a deep green color, occurs in deposits of chromic iron in the Ural mountains. The crystals have a beautiful dichroism, appearing, when viewed by daylight, yellow brown, parallel to the optic axis, and blue-green at right angles to the axis. Viewed by lamplight the yellow-brown color changes to ruby-red, and the green color nearly disappears. The result is, that the crystals are green by daylight and intense red by lamplight—a phenomenon shared by alexandrite.

The chrome tourmaline has a specific gravity of 3.120. Before the blowpipe it melts somewhat easily to a grayish-white, opaque bead. With borax and salt of phosphorus it gives a fine green bead, and in the latter flux a skeleton of silica. It is only decomposed by acids after fusion. The analysis was as follows:

SiO ₂	Bo ₃	Al ₂ O ₃	Cr ₂ O ₃	FeO	MgO	CaO	NaO	H ₂ O	F
35.79	9.51	30.51	10.86	2.91	4.47	.72	1.36	2.25	.65 = 100.08

It is to be classed in the third group of tourmalines of Rammeisberg's classification.

PARAFFINE IN LAVA.—O. Silvestri has found that the basaltic lava in the neighborhood of Etna, contains small geodes filled with solid crystallized paraffine. The paraffine is in large translucent plates of waxy appearance and yellowish-white color, with a melting point of 56°. It is soluble in ether and in boiling alcohol.

NEW LOCALITIES.—A. Schmidt describes small transparent crystals of *newberyite* from Mejellones, Chili. They occur in crevices in guano, and having bright lustrous faces, could be accurately measured in the reflecting goniometer. They are orthorhombic in tabular crystals, with a hardness somewhat more than 3, and a specific gravity of about 2.10. Newberyite had previously been found in Victoria, Australia.

Damour gives an analysis of *fuchsinite* from the Urals, and Arzruni describes its physical properties.

Mendosite, a sodium alum, occurs in the province of Idzumo, Japan, in considerable quantity, as an efflorescence upon albite.

¹ Edited by Professor H. CARVILL LEWIS, Academy of Natural Sciences, Philadelphia, to whom communications, papers for review, etc., should be sent.